

FORCE-RESPONSIVE TOOTHBRUSH

SPECIFICATION

FIELD OF THE INVENTION

5 The present invention relates to a toothbrush. More particularly this invention concerns a toothbrush that provides the user with an indication when too much force is applied while brushing.

BACKGROUND OF THE INVENTION

10 In recent times it has been determined that it is unhealthy for the gums and teeth if too much force is applied with a toothbrush during brushing. When pressed hard against the gums and teeth, bristles of the brush can get under and loosen the gums, and can also actually injure the gums, leading to periodontal problems and various associated problems.

15 It is known to provide a toothbrush with means for indicating the proper up-and-down brushing stroke, that is movement of the bristles along rather than across the teeth, is being used. Such systems are described in US patent 2,877,477, 4,253,212, and 5,673,451.

20 Other systems, such as 4,476,604, 5,282,291, and 5,355,544 as well as in the product literature for the Oral-B 3D

Excel™ toothbrush, are known for providing the user with feedback when too much or too little force is applied during brushing. These systems are relatively effective, but all entail a fairly complicated structure and in some cases even a relatively complex electronic sensing arrangement that elevates the cost of the toothbrush beyond what a consumer is willing to spend.

OBJECTS OF THE INVENTION

It is therefore an object of the present invention to provide an improved toothbrush.

Another object is the provision of such an improved toothbrush which overcomes the above-given disadvantages, that is which provides positive feedback when too much brushing force is applied, yet which is simple and inexpensive to manufacture.

SUMMARY OF THE INVENTION

A toothbrush has according to the invention an inner handle part having an outer end, an outer handle part having an outer end remote from the inner handle part and an inner end juxtaposed with the inner-part outer end, bristles on the outer-part outer end, and a releasable joint between the inner-part outer end and the inner-part inner end. This joint releasably secures the handle parts together and can open and release when a

lateral force is applied to the outer-part outer end that exceeds a predetermined safe brushing force.

Thus with the system of this invention a simple two-part joint, e.g. a ball-and-socket snap joint, is provided in the handle. When the user presses too hard during brushing, the joint opens and the user need merely fit the joint back together before continuing. In very short order the user knows to keep brushing pressure below the disconnect threshold.

With this system, unlike the prior art, the toothbrush is a very simple structure that can be produced at about the same cost as a conventional one-piece toothbrush. Thus it can be given away by a dentist as a way of training ~~young children in~~ proper brushing technique.

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The toothbrush further has according to the invention a tether between the handle parts so that the parts remain connected together by the tether even when the joint opens. This tether is a flexible web extending between the outer-part inner end and the inner-part outer end. It is molded unitarily with the inner part and outer part. Thus the tether can be made when the brush handle is injection molded at no extra cost, the same as the two parts of the joint that releases when excessive force is used.

BRIEF DESCRIPTION OF THE DRAWING

The above and other objects, features, and advantages will become more readily apparent from the following description, reference being made to the accompanying drawing in which:

5 FIG. 1 is a partly sectional side view of a brush according to the invention in the assembled condition; and

 FIG. 2 is a view of a detail of the brush when in the open condition.

SPECIFIC DESCRIPTION

10 As seen in FIG. 1 a toothbrush 10 basically comprises an outer handle part 11 and an inner handle part 12. The outer part 11 is what is normally gripped by the user and the inner part 12 carries a standard array of bristles 13.

15 In accordance with the invention the inner end of the outer part 11 and the outer end of the inner part 12 are secured together at a releasable joint 14 here formed as a ball 15 carried on the outer part 11 and a complementary socket 16 formed on the inner part 12. The ball 15 and socket 16 are a tight fit, but still are capable of pulling apart if the outer end of the
20 outer part 12 is pressed laterally with a predetermined force as indicated at F so that the joint 14 opens as shown in FIG. 2. This force F corresponds to what is considered to be the maximum

safe brushing force that should be applied by the bristles 13 to the teeth.

To prevent the two parts 11 and 12 from getting separated, a flexible plastic tether 17 is formed with the parts 11 and 12 and extends between them. It is injection-molded with the parts 11 and 12 and is unitary with them, but is so thin that it is quite flexible.

Thus if the user of the brush 10 according to the invention presses too hard, the joint 14 will open. It is relatively easy to snap the joint 14 back together and resume brushing, of course with less force. In this manner the user quickly learns to brush with the desired light force sufficient to clean the teeth without damaging the gums.

The brush 10 according to the invention can be manufactured at virtually the same cost as a standard one-piece brush. The mold in which the handle is molded will be somewhat more expensive, but otherwise the production costs for the force-responsive brush of this invention will be substantially the same as for a standard brush.